

NON-PUBLIC?: N
ACCESSION #: 9508160178
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Arkansas Nuclear One - Unit 1 PAGE: 1 OF 4

DOCKET NUMBER: 05000313

TITLE: Reactor Trip On High Reactor Coolant System Pressure
Which Resulted From Closure Of The Main Turbine Governor
And Intercept Valves Due To The Failure Of A Main
Generator Output Circuit Breaker Contact
EVENT DATE: 07/15/95 LER #: 95-009-00 REPORT DATE: 08/11/95

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: N POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR
SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: Richard H. Scheide, Nuclear Safety and
Licensing Specialist TELEPHONE: (501) 858-5000

COMPONENT FAILURE DESCRIPTION:
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:
REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On July 15, 1995, at approximately 0818, an automatic reactor trip was initiated by the Reactor Protection System on high Reactor Coolant System pressure which resulted from the automatic closure of the main turbine governor and intercept valves by the turbine Electro Hydraulic Control (EHC) system. All control rods inserted into the core, as designed, and the post trip plant response was normal. Immediate operator actions were completed with no significant complications. The reactor trip occurred when one of the two main generator output circuit breakers was opened for maintenance. The EHC system sensed that both of the output circuit breakers were open due to a failed contact in the closed output circuit breaker which provides breaker position status to the system. The EHC system then shifted from the load control mode to the speed control mode

and initiated closure of the governor and intercept valves (as designed). The ensuing transient resulted in the reactor trip. The root cause of the contact failure is indeterminate. A failure analysis will be conducted after the contact switch is repaired during the next refueling outage. Spare contacts were wired in parallel with all of the main generator output circuit breaker status contacts in the EHC logic circuit to prevent a single contact failure from giving a false breaker position indication. The reactor was returned to power and the unit was tied to the grid at 2112 on July 16, 1995.

END OF ABSTRACT

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A. Plant Status

At the time this event occurred, Arkansas Nuclear One, Unit-1 (ANO-1) was operating at 100 percent power. Reactor Coolant System (RCS)AB! temperature was approximately 579 degrees and RCS pressure was 2155 psig.

B. Event Description

On July 15, 1995, at approximately 0818, a reactor trip was initiated by the Reactor Protection System (RPS)JE! due to high RCS pressure which resulted from the automatic closure of the main turbine governor and intercept valves by the Electro Hydraulic Control (EHC)TG! system.

ANO-1 utilizes two circuit breakers in parallel (B-5114, B-5118) to connect the main generator output to the transmission grid. The turbine generator EHC system operates in either the "speed" or "load" control mode based on the status of the main generator output circuit breakers. The EHC system controls the turbine in the load control mode when either of the output circuit breakers is closed and in the speed mode when both circuit breakers are open and the generator is unloaded. Each generator output circuit breaker is made up of three single phase circuit breakers. The EHC system uses a logic circuit made up of "a" contacts from each of the single phase circuit breakers and is configured such that if at least one of the single phase circuit breakers from an output circuit breakers is open, the EHC system senses that its associated output circuit breaker is open.

At 0800 on July 15, maintenance was begun on main generator output circuit breaker B-5118 to repair a leak on its compressed air system. The EHC system was in the load control mode with both generator

output circuit breakers closed. At 0818, B-5118 was opened from the control room at the request of maintenance personnel. The EHC system sensed that both generator output circuit breakers were open and responded immediately by shifting to the speed control mode and initiating turbine governor valve and intercept valve closure, as designed. The ensuing plant transient resulted in the RPS initiating a reactor trip on high RCS pressure approximately six seconds after B-5118 was opened. All control rods inserted into the core, as required. The post trip plant response was normal and immediate operator actions were accomplished with no significant complications and the plant was subsequently stabilized at Hot Shutdown conditions.

Troubleshooting and repairs were completed at 2257 on July 15 and the reactor was returned to criticality at 1126 on July 16. The unit was tied to the grid at 2112 on July 16.

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C. Root Cause

An investigation into the cause of the trip identified that one of the single phase circuit breaker position status contacts for output circuit breaker B-5114 appeared to be slightly bent, preventing it from making contact when the circuit breaker was closed. When B-5118 was opened, the EHC system sensed that both generator output circuit breakers were open and shifted to speed control, initiating governor and intercept valve closure, as designed.

The root cause of the contact failure is indeterminate. However, the circuit breaker status contacts were known to be functioning properly during startup from refueling outage 1R12 on April 1, 1995, as the main generator was connected to the grid using output circuit breaker B-5114. The circuit breaker had been cycled two times since that date prior to the reactor trip.

A failure analysis will be performed after repairs are made during the next refueling outage.

D. Corrective Actions

Corrective actions were completed on July 15 to restore the EHC logic circuit to a functional status by permanently wiring a spare contact in parallel with the damaged contact. In addition, similar wiring changes were made to the other circuit breaker position status contacts to prevent the failure of a single contact from indicating a

false circuit breaker position indication.

The damaged contact switch will be repaired during the next refueling outage and a failure analysis will be completed by December 31, 1996.

A review of the ANO-2 EHC system will be completed by March 29, 1996, to determine if any circuit reliability enhancements are necessary.

Reviews of maintenance history for ANO and other Entergy sites and discussions with the EHC vendor identified no similar failures.

Therefore, this condition is considered to be an isolated event and no further Corrective actions are deemed necessary.

E. Safety Significance

The RPS initiated a reactor trip, as designed. The post trip response of all plant systems was normal and immediate operator actions were accomplished with no significant complications.

Therefore, this event is considered to be of minimal safety significance.

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F. Basis for Reportability

Actuation of the RPS is a reportable event in accordance with 10CFR50.73(a)(2)(iv). This event was also reported to the NRC Operations Center at 1134 on July 15, 1995, in accordance with 10CFR50.72.

G. Additional Information

There have been no previous reactor trips at ANO which were initiated by the failure of main generator output circuit breaker logic system contacts.

Energy Industry Identification System (EIIS) codes are identified in the text as XX!.

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ENTERGY

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August 11, 1995

1CAN089503

U. S. Nuclear Regulatory Commission
Document Control Desk
Mail Station P1-137
Washington, DC 20555

Subject: Arkansas Nuclear One - Unit 1
Docket No. 50-313
License No. DPR-51
Licensee Event Report 50-313/95-009-00

Gentlemen:

In accordance with 10CFR50.73(a)(2)(iv), enclosed is the subject report concerning a reactor trip.

Very truly yours,

Dwight C. Mims
Director, Licensing

DCM/rhs

enclosure

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U. S. NRC
August 11, 1995
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